

Influence of Hydrogen Bond Between Solvent Molecules on the Process Formation of the Associated Molecules of the Dissolved Substance

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Absorption and fluorescence spectra of aryl ethylene (AE) and other related organic compounds in different solvent with various properties: dimethyl formamide (DMF), dimethyl sulfoxide (DMS), n-propanol, chloroform, dioxane, toluene, hexane, cyclohexane had been studied. The results showed that in a broad region of concentration 10^{-3} - 10^{-5} mol/l the absorption and fluorescence spectra of the chosen compounds do not have noticeable changes. These results show that the studied substances in the chosen solvents are in a monomer state. The essential spectral changes taking place in binary solvents (dioxane + water, DMF + water, DMS + water). The choice of these binary solvents are conditioned in order so that they intermix with each other, moreover, the molecules of the chosen compounds are practically undissolved in water.

The choice of these binary solvents were arranged so that they form between themselves hydrogen bonds. Moreover in water, the chosen molecule compounds are practically undissolved, that apparently to promote the development of the associational process of dissolved substance molecules. The carried out experiments showed that the same change of absorption and fluorescence spectra was observed as the of binary solvent composition changed (at constant concentration of dissolved substance molecules), so at the change of concentration at constant composition of binary solvents.

It was discovered that in the chosen binary solvents the luminescent associations of AE molecules are formed with characteristic spectra of absorption and fluorescence.

The increase of solution temperature leads to the restoration of absorption and fluorescence spectra which is characteristic for monomer molecules. From temperature experiments the energy of links of associated AE molecules was determined.